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PEROXIDASE IN POTATO PLANTS INFECTED BY SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC.

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[A Digest]

After a brief review of the wart disease of potatoes caused by the fungus Synchytrium endobioticum, the problem of the change in peroxidase activity when the potato plant is infected by S. endobioticum, is subject to discussion.

At present, the oxidation system of the plant is credited with great importance in the plant's resistance against microorganisms. The positive defensive role of oxidase in the resistance of plants against microorganisms has been noted in a number of works.

The benzidine method was used for determination of peroxidase. Both potato sprouts infected in the laboratory and diseased potatoes from the field were used for analysis. Changes in the peroxidase activity were determined for infection of sprouts, stems, stolons, and tubers of the potato plant by the fungus S. endobioticum.

Healthy sprouts of the Vol'tman and Ella varieties were infected 4 August in the laboratory and analyzed 3 September after the warts that had formed on the sprouts had become quite large.

A table included in the article describes the results of the experiment and lists the following: the variety (Ella, Vol'tman, Seyanets, Laykova, Seyanets 1390-11, and 1255-21); the material analyzed (warts on stolons, on tubers etc.); and the relative peroxidase activity.

The table gives comparative determinations of peroxidase activity in healthy and infected stems and leaves. The table also shows that when sprouts are infected and warts form on them, peroxidase activity increases in comparison with

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normal sprouts. Microscopic study of green and brown warts (growth completed) showed a larger number of summer sporangia in the former and a predominance of winter sporangia in the latter. Higher peroxidase activity in the brown warts in comparison with the green warts was observed in both varieties studied (Ella and Vol'tman). This is connected with the formation, growth and ripening of winter sporangia in the warts. When the tissues begin to die, the peroxidase activity drops, but still remains higher than in healthy sprouts.

Increased peroxidase activity was also observed in those cases where the warts had not yet formed but the epidermal cells contained the parasite (zoospores) which produces summer sporangia.

In tuber tissues, located directly beneath the warty outgrowths, the increase in peroxidase activity was limited to the tissues located directly beneath the wart, but this increase did not extend into the depths of the tuber. Consequently, the increase in peroxidase activity in the infection of the potato plant by S. endobioticum is purely local.

The material studied in the second case was infected under natural conditions in the field experimental station, where the resistance of the Seyanets variety against wart disease was evaluated. When the leaves of the potato plant were infected, they, along with the tubers, stolons, and stems, became abnormally thick and expanded and formed a distinctive type of wart. These deformed leaves were green, but easily could be distinguished from normal leaves by their form.

An increase in peroxidase activity was observed in both the warts and the leaves. Characteristically, here again the increase in peroxidase activity was localized and did not extend throughout the infected organ.

An increase in peroxidase activity was also observed when stolons and tubers were infected with wart disease.

Peroxidase activity was increased in warts on stolons and tubers. The greatest peroxidase activity was observed in the Vol'tman variety in a brown wart on a stolon where more winter sporangia and less summer sporangia were found in the warty tissues. The peroxidase activity was higher in a wart on the top of a tuber than on the top of a healthy tuber. The increase in peroxidase activity in the wart on the tuber was limited solely to its tissues and the tuber tissues located directly under the wart; thus the increase was again localized and did not extend throughout the diseased tuber.

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